

case when a fault on the transmission line might cause electricity to arc from the conductor to the tower and go to ground. This could produce a dangerous voltage on an underground piping or cable system.

Wire Fences

Barbed wire and woven wire fences insulated from ground on wood posts can assume an electrostatic voltage when located near transmission lines. Normally, the voltage will not be noticeable. If you are having a problem, call BPA for an investigation. The fence may need to be grounded if it:

- crosses the right-of-way;
- parallels the line within 125 feet of the outside conductor and is longer than 150 feet; or
- parallels the line 125 to 250 feet from the conductor and is longer than 6,000 feet.

These fences should be grounded at each end and every 200 feet with a metal post driven at least 2 feet into the ground. Attach all wire strands of the fence to the metal post. Install the grounding posts at least 50 feet from the nearest transmission tower. If nuisance shocks are experienced when contacting a fence or gate, or if you have any questions about the need for grounding, call the nearest BPA regional office.

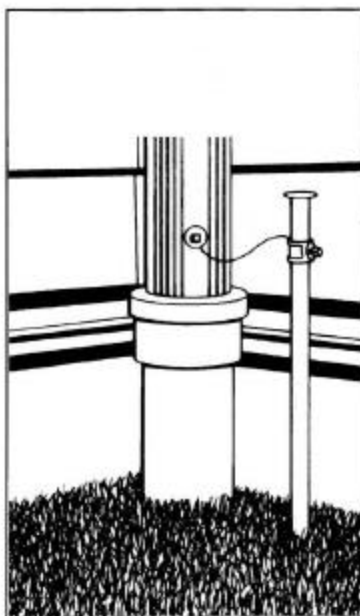
Electric Fences

In certain situations, BPA provides electric filters to ground 60-Hz voltages induced by a power line. These filters will allow the charging voltage on the fence to be effective. BPA provides these filters if the electric fence:

- crosses the right-of-way;
- parallels the line within 60 feet of the outside conductor and is longer than 1,000 feet; or

- parallels the line within 125 feet of the outside conductor and is longer than 2,500 feet.

Do not use fence chargers that are not approved by Underwriters' Laboratories, Inc. They may carry voltages and currents that are hazardous to anyone touching the fence — even if transmission lines are not present. For more information about fences, fence chargers or filters, call the nearest BPA regional office.



Buildings

This section applies to buildings outside BPA's rights-of-way, since BPA prohibits buildings within a right-of-way.

Metal buildings are buildings whose frame, roof or walls consist of substantial amounts of metal. A voltage induced on a metal building is usually drained away through the building's plumbing, electrical service, metal sheeting or metal frame. Nonetheless, BPA's present practice is to ground any

metal building near a 500,000-volt line when:

- it is within 100 feet of the outside conductor;
- it has more than 2,000 square feet of metal surface and is within 100 to 150 square feet of the outside conductor; or
- it is used to store flammable materials and is within 250 feet of the outside conductor.

One grounding rod is adequate for a building with less than 2,000 square feet of metal surface. Two grounding rods are used if a building's metal surface exceeds 2,000 square feet of metal surface. Two grounding rods are used if a building's metal surface exceeds 2,000 square feet. Even if the metal surface is less than 2,000 square feet, an extra grounding rod is useful in case one is damaged or develops a high-resistance contact.

Aluminum windows, downspouts, gutters or other metal parts on buildings constructed of wood or other insulating materials may also require grounding as shown above.

Again, call BPA if you have any questions about grounding a building.

Vehicles

Under some high-voltage lines, vehicles can carry a nuisance shock. This is particularly true if the vehicle is parked on a nonconductive surface such as dry rock. You can drain the shock from your vehicle to the ground by attaching a chain that reaches the ground to the vehicle or by leaning a metal bar against your vehicle. The only way to be sure you won't get shocked is to park your car away from the power line.

Theoretically, it is possible that an electric spark from an induced voltage could ignite a gasoline vapor that is created during refueling of a vehicle. BPA has never had a report of a

refueling accident near our lines. Such an accident could occur, but the vehicle would have to be insulated from ground and the fuel and air would have to mix together in proportions that would have to be almost exactly right for an explosion. The chance that all these conditions would occur simultaneously is remote.

However, because such an accident is theoretically possible, BPA recommends that you not refuel your vehicle in close proximity to a transmission line.

Lightning

Lightning will usually strike the highest nearby object. In rural areas, this may be a power line tower or conductor. Transmission facilities are designed to withstand lightning strikes by channeling them to ground at the tower. When lightning strikes a tower, the damage is usually much less than if a barn or tree had been hit.

Play it safe. Stay away from power lines and other tall objects during electrical storms. Lightning is dangerous if you are standing near where it enters the ground.

Fires

Smoke and hot gases from a large fire can create a conductive path for electricity. When a fire is burning under a transmission line, electricity could arc from the conductor to the ground, endangering people and objects near the arc.

Field burning and other large fires in and around transmission lines can damage transmission lines and cause power outages. Water and other chemicals used to extinguish those fires should never be directed toward a transmission line.

Kite Flying and Model Airplanes

BPA discourages anyone from flying a kite or model airplane

anywhere near a power line. However, if your kite or model airplane is about to touch a power line, drop the string or handline instantly, before it touches the line. Do not try to pull the kite or airplane down or climb up after it. Call the nearest electric utility.

Vandalism and Shooting

When hunting in remote areas, do not shoot at transmission lines.

Insulators are, for the most part, made of porcelain or glass and are easily broken. Not only can broken insulators cause flashovers, an insulator string hit by gunfire could pull apart and let the conductor fall to the ground. This could be a serious hazard to anyone close to the line. It could also cause a power outage and possible a fire in dry areas.

Unfortunately, most insulator damage from gunfire is the result of simple vandalism.

Hunters sometimes assume that the land under a transmission line belongs to the federal government and is therefore public property. This is rarely the case. Most land beneath power lines — except in national forests or on Bureau of Land Management lands — is privately owned.

Those who cause willful damage to BPA transmission facilities or property along easements can be prosecuted by the federal government, the property owner, or both.

Remember, insulators and conductors are not fair game. Do not use them for target practice. To do so is illegal and can be extremely hazardous.

Please report broken insulators and conductors, or any other damage you see, to BPA's Crime Witness program by calling 1-800-437-2744. Crime Witness allows you to report, confidentially, an illegal activity that you witness against BPA's transmission system, property or personnel.

This includes:

- Shooting at power lines, transmission towers or substation equipment.
- Dumping of any waste or material on BPA property.
- Vandalism to BPA property, buildings and vehicles.
- Theft of BPA equipment, supplies, tools or materials.

The program offers rewards of up to \$1,000 for information leading to the arrest and conviction of the persons causing the damage.

Metal Objects

As a precautionary practice, do not raise any metal object more than 14 feet in the air underneath a transmission line.

When you mount an antenna on a large vehicle that you plan to operate on a BPA easement, do not let it extend more than 14 feet above the ground.

Before you sail a boat on a lake or river, check the allowable clearance under any transmission line. We recommend that all masts or guy wires above the deck be connected electrically to an underwater metallic part such as the keel or centerboard. This precaution, which protects against lightning or accidental contact with a power line, may save your life.

Swimming pool skimmers should not be raised vertically under any power line. BPA strongly discourages the building of swimming pools within BPA easements because of the possibility of an accident.

Climbing

Climbing on power line poles, towers or guy wires can be extremely hazardous. Don't do it under any circumstances.

Pacemakers

Under some circumstances, voltages and currents from power

lines, and household and other electrical devices may interfere with the operation of some implanted cardiac pacemakers. However, we know of no case where a BPA line has harmed a pacemaker patient.

As a precaution, persons who may have reason to be very near high-voltage facilities should consult with a physician to determine whether their particular implant may be susceptible to 60-Hz interference.

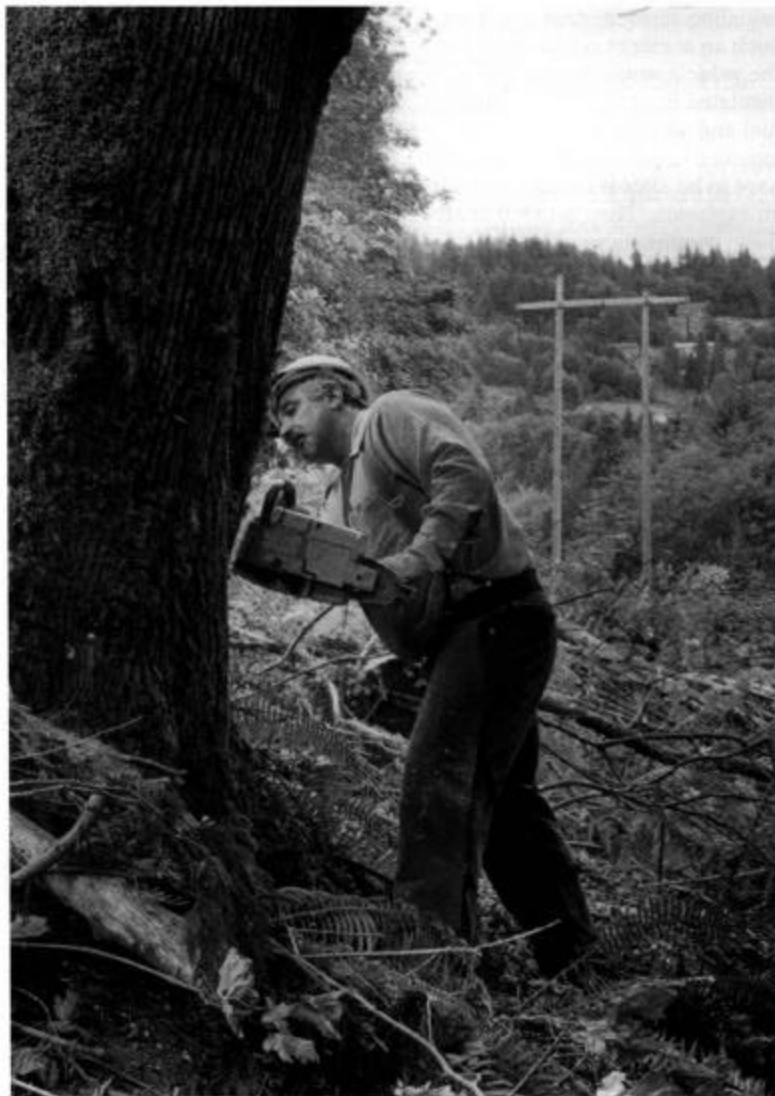
If a person with a pacemaker is in an electrical environment and the pacemaker begins to produce a regularly spaced pulse that is not related to a normal heartbeat, the person should leave the environment and consult a physician.

Trees and Logging

No logging or tree cutting should be done within BPA's easement without first contacting the nearest BPA regional office. In many cases BPA owns the timber within its easements. Additionally, logging near transmission lines can be very hazardous and requires special caution. Since trees conduct electricity, if one should fall into or close to a line, the current could follow the tree trunk to the ground and endanger anyone standing near its base. Here are two simple rules: If you should come upon a tree which has fallen into a power line, stay away from it. If you should accidentally cause a tree to fall into a line, run for your life! Do not go back to retrieve your saw or equipment. Call BPA or your local utility immediately.

We suggest if you have trees either on or close to the easement which need to be cut and could fall on or close to a transmission line, that you contact BPA. It may be safer to have BPA remove the trees than to do it yourself.

Since transmission line rights-of-way are usually not owned by BPA, but are acquired through easements from the landowner,



Cutting trees within power line rights-of-way can be dangerous. It may be safer to have BPA do it for you.

trees or logs stacked within or alongside them are not public property. People removing trees and logs without permission are stealing and can be prosecuted.

In addition, there are special considerations for growing Christmas trees, orchards and other tall-growing vegetation. Ask for the *"Landowner's Guide to Trees and Transmission Lines"* and the *"Landowners Guide to Use of BPA Rights-of-Way."*

Explosives

If you plan to detonate explosives near a BPA transmission line, notify BPA well in advance. See the list at the front of this booklet for the address and telephone number of the BPA office nearest you. BPA will tell you if any special precautionary measures must be taken at a particular blasting site.

As a general rule, do not use electric detonating devices when blasting within 1,000 feet of a power line. Nonelectric methods of detonation will avoid the



NEVER climb towers or poles.

danger of accidentally discharging an electric blasting cap.

If you are blasting within 1,000 feet of a power line and there is no reasonable alternative to the use of an electronic detonating device, you must clear the layout of the electric detonation circuit with BPA.

Concerning Towers and Conductors

- Do not climb towers.
- Do not shoot or otherwise damage insulators.
- Never touch a fallen line.
- Do not attempt to dismantal tower steel members.
- Do not apply additional loads to tower members for temporary support of a structure or vehicle.
- Stay away from towers and lines during extreme wind storms, thunder storms, ice storms or under other extreme conditions.

Preventive measures include:

- Stay away from and report broken or damaged insulators to BPA or your nearest electrical utility.
- Stay away from and report broken, damaged or abnormally low-hanging lines to BPA or your nearest electrical utility.

Conclusion

We live in an age of electric power. Almost everything we do requires it. Consequently, high-voltage power lines have become about as commonplace as the wiring in our homes — and just as safe. Nevertheless, every year people are killed or seriously injured by power lines and wiring. In almost every case, lives could have been saved and injuries avoided if the basic safety practices outlined in this booklet had been followed. BPA and your local utilities make every effort to design and build power lines that are safe to live and work around. Ultimately, however, the safety of high-voltage lines depends upon people behaving safely around them. No line can practicably be made safe from a person who, through ignorance or foolishness, violates the basic principles of safety. So, please, take time now to learn the practices outlined in this booklet. And share your knowledge with your family, friends and colleagues. Your own life, or that of a loved one, might well hang in the balance.

Related BPA Publications

Call BPA's document request line at **1-800-622-4520** and ask for the following publications:

- 1) For information on possible long-term biological effects of transmission lines: *"What We Know (and don't know) About EMF"* (DOE/BP-2059)
- 2) For information on using the land under a BPA right-of-way: *"Landowner's Guide to Use of BPA Rights-of-Way"* (DOE/BP-1678)
- 3) For information on growing trees on a BPA right-of-way: *"Landowner's Guide to Trees and Transmission Lines"* (DOE/BP-2868)

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